

I claim:

1. An automatic production apparatus comprising:

(a) a power operated conveyor for work-in-process defining a production line for carrying work substantially horizontally to be operated upon,

(b) means for holding and prepositioning different units of work at spaced intervals on said conveyor,

(c) a plurality of automatic machine tools having respective operating tool heads and individual tools for performing different operations on work disposed aligned with the respective machine tools,

(d) means for supporting each of said machine tools at predetermined locations adjacent said conveyor,

(e) first means for guiding each tool head in a substantially horizontal direction and substantially parallel to said conveyor on said support means,

(f) second means for guiding and locating each tool head vertically with respect to said supporting means,

(g) third means for guiding each tool on its supporting means to travel towards and away from work positioned aligned therewith on said conveyor,

(h) power means for operating each machine tool to cause the tool thereof to execute three axis travel with respect to work positioned thereopposite on the conveyor,

(i) power means for operating said conveyor to carry different units of work into alignment with respective of said machine tools,

(j) means for controlling the operation of said conveyor or power means and the means for operating respective of said machine tools to cause said conveyor to predeterminately align work thereon with respective of said machine tools and, upon

effecting such alignment, to cause said machine tools to execute respective three axis movement of their tools with respect to the aligned work so as to perform predetermined operations on each unit of work as it travels said production line.

2. An automatic production apparatus in accordance with claim 1 wherein said means for supporting each of said tools adjacent said conveyor comprises a common support means extending parallel to and above said conveyor.

3. An automatic production apparatus in accordance with claim 2 wherein said common support includes guide means for guiding each tool in a direction parallel to said conveyor and means for predeterminately locating and locking each tool on said common support means prior to operating.

4. An apparatus in accordance with claim 1 wherein said means for supporting said tools is disposed on both sides of said conveyor for locating respective tools facing opposite sides of work on the conveyor.

5. An apparatus in accordance with claim 4 wherein said conveyor is a flight conveyor having an endless array of flights, operable to be driven substantially horizontally, and said means for supporting said tools includes structural beam means disposed over and above said conveyor and extending in the direction of substantially parallel position to said conveyor

6. An automatic production apparatus comprising:

a conveyor for carrying work-in-process at spaced apart locations on said conveyor, said conveyor being operative for carrying work substantially horizontally and defining a production line,

a plurality of separately operable machine tools disposed adjacent both sides of said conveyor, each machine tool having a tool head and a respective tool transport means for guiding and driving said tool head in a plurality of directions with respect to work on said conveyor,

respective guide and locating means for each tool transport means located over and above both sides of said conveyor for variably adjustably locating each tool transport means with respect to the conveyor,

means for prepositioning each tool transport means on respective of said guide means at different predetermined locations prior to initiating operation of said apparatus,

means for operating said conveyor to locate respective units of work in alignment with respective of said tools,

and means for operating said tools to perform predetermined operations on work disposed on said conveyor aligned with said tools.

7. An automatic production apparatus in accordance with claim 6 including respective powered means for driving each tool transport means in both directions along their respective guide means and means for predeterminately controlling said powered means to preposition each transport means with respect to said conveyor prior to initiating operations by said machine tools on work supported by said conveyor.

8. An automatic production apparatus in accordance with claim 6 including means for driving each tool head along a plurality of axes on its transport means for performing different operations on work aligned with the transport means for the tools.